

Making Spaceflight Practical and Affordable: Spacecraft Designs and their Degree of Operability

Alan R. Crocker

As we push toward new and diverse space transportation capabilities, reduction in operations cost will become increasingly important. Achieving affordable and safe human spaceflight capabilities will be the mark of success for new programs and new providers. This paper reviews NASA's history in developing and operating human rated spacecraft, reviewing the key aspects of spacecraft design and their resultant impacts on operations phase complexity and cost. Specific examples from current and past programs are provided to tie together early program requirements, design implementation and resulting real-time operations experience into a complete "story" of design decisions and operational results. Based on these experiences, recommended techniques are outlined to enable earlier and more effective assessment of operations concerns during the design process.